



INTRODUCTION OF ASTHMA & ITS PREVENTION & TREATMENT

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Abstract:

Asthma is chronic inflammatory disorder of the airway. This feature of asthma has implication for the diagnosis, management, potential and prevention of the disease. Airway inflammation contributes to airway hyper responsiveness, airflow limitation, respiratory symptoms, and disease chronicity.

In some patient, persistent changes in airway structure occurs, including sub- basement fibrosis, mucus hyper secretion, injury to epithelial cell, smooth muscle hypertrophy and angiogenesis.

Gene by environment interaction are important to the expression of asthma. Viral respiratory infections are of the most important causes of asthma and also contribution to development of asthma.

The onset of asthma for most patient beings early in life with the pattern diseases persistence determined by early.

Recognized risk factors including atrophic diseases recurrent wheezing and patient history of asthma.

Current asthma treatment with anti-inflammatory therapy does not appear to prevent progression of the underlying diseases severity. The critical role inflammatory has been further substantiated but evidence in emerging for considerable variability in the pattern of inflammation.

The immunohistopathologic feature of asthma include inflammatory cell in filtration.

- Eosinophils
- Lymphocytes
- Mast cell activation

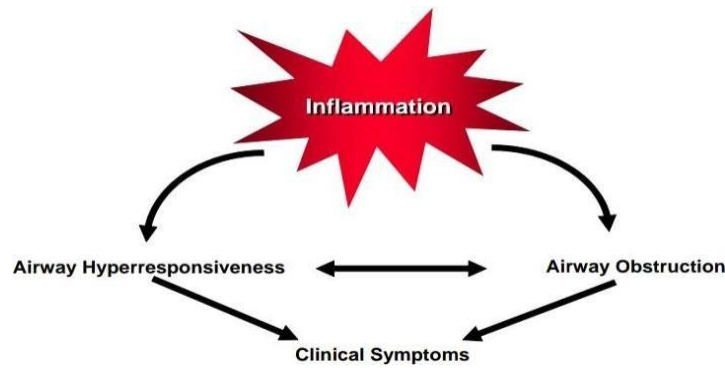
Introduction

Asthma is a common long term inflammatory disease of the airways of the lungs. It is characterized by variable and recurring symptoms, reversible airflow obstruction, and bronchospasm. Symptoms include episodes of wheezing, coughing, chest tightness, and shortness of breath. These episodes may occur a few times a day or a few times per week. Depending on the person they may become worse at night or with exercise.

Asthma is thought to be caused by a combination of genetic and environmental factors. Environmental factors include exposure to air pollution and allergens. Other potential triggers include medications such as aspirin and beta blockers. Diagnosis is usually based on the pattern of symptoms, response to therapy over time, and spirometry. Asthma is classified according to the frequency of symptoms, forced expiratory volume in one second (FEV1), and peak expiratory flow rate. It may also be classified as atopic or non-atopic where atopy refers to a predisposition toward developing a type 1 hypersensitivity reaction.

There is no cure for asthma. Symptoms can be prevented by avoiding triggers, such as allergens and irritants, and by the use of inhaled corticosteroids. Long-acting beta agonists (LABA) or antileukotriene agents may be used in addition to inhaled corticosteroids if asthma symptoms remain uncontrolled. Treatment of rapidly worsening symptoms is usually with an inhaled short-acting beta-2 agonist such as salbutamol and corticosteroids taken by mouth. In very severe cases, intravenous corticosteroids, magnesium sulfate, and hospitalization may be required.

In 2013, 242 million people globally had asthma up from 183 million in 1990. It caused about 489,000 deaths in 2013, most of which occurred in the developing world. It often begins in childhood. The rates of asthma have increased significantly since the 1960s. Asthma was recognized as early as Ancient Egypt.



Type of Asthma

There are mainly six kinds of Asthma as below:

1. Allergic asthma
2. Asthma without allergies
3. Aspirin Exacerbated Respiratory Disease (AERD)
4. Exercise induced asthma
5. Cough variant
6. Occupational asthma

1. Allergic asthma:

This type occurs when an allergy sets off an asthma flare up. Mold, roaches, pollens and pet dander are common allergies, but the list can be endless. Food sensitivities may also play a role. “I think food can have a lot to do with it when it comes to the toxic burden that you put in your body,” says Pescatore.

Pescatore explains there is a strong correlation between casein, the protein in milk and cheese that may trigger asthma. Gluten, yeast and sugar may also be culprits. “I always look for the nontoxic approach first, so I have people do food elimination diets and a food sensitivity test,” says Pescatore.

“Most of the time we treat this type by finding out what patients are allergic to first, so they know what they should avoid,” says Lee. Patients may be prescribed inhaled corticosteroids depending on the severity of their asthma.

2. Asthma without allergies:

People may also have asthma not triggered by allergies. Usually an upper respiratory infection (cold, flu, and rhinovirus) sets off their asthma. As soon as cold or flu symptoms appear patients are typically prescribed a short course of inhaled corticosteroids for 10-14 days.

Pescatore has patients eliminate known allergies, any food sensitivities and eat a clean diet of low glycemic index protein, fruits, vegetables and nuts to see if this makes a difference. “Anybody who has asthma has an inflammatory condition,” says Pescatore. “If you decrease inflammation in the body, you decrease your body’s need to ‘act out’ so to speak. When there is less inflammation around there is less need for your bronchials to constrict and your mast cells to activate and all of the things that occur during an asthma attack.”

3. Aspirin Exacerbated Respiratory Disease (AERD):

This type is triggered by aspirin. Patients may have nasal polyps, rhinitis, sneezing and a runny nose, and a history of aspirin sensitivity. When they take aspirin, they develop sneezing and a stuffy nose, which leads to wheezing and difficulty breathing. “If this type of asthma is severe enough, we actually recommend aspirin desensitization. The body is desensitized with incremental doses of aspirin usually done in a hospital setting,” says Lee. Once people tolerate the full dose of aspirin they take a daily maintenance dose, which has been shown to help with polyps, allergies and asthma.

4. Exercise induced asthma:

For these asthmatics, any type of physical exertion or sports leads to coughing, difficulty breathing and chest tightness that improves when they stop the exertion. Typical treatment is an inhaled bronchodilator medication to open their airway taken about fifteen minutes before exercise.

“There are multiple studies that say taking 2000 mg of vitamin C before exercise can relieve exercise induced asthma,” says Pescatore. Some folks also have cold weather induced asthma. Cold air can be a lung irritant just like perfume or cigarette smoke. This generally occurs in winter.

5. Cough variant:

Cough variant is asthma that is characterized by a dry hacking cough. It can occur while awake or asleep and affect both adults and children. Patients usually respond well to inhaled corticosteroids. Vitamin D has also been shown to improve asthma. Studies show there is less incidence of asthma in the south, which may be related to people having less sun exposure and lower vitamin D levels in northern climates.

6. Occupational asthma:

Occupational asthma occurs when something on the job sets off an asthma attack. Irritant induced asthma is usually from smoke or inhaled irritants like chlorine. It's not related to an allergy; the irritant is inhaled and triggers an attack.

In occupations that deal with chemicals like paint or lab animals like rats or mice, patients may also be allergic to their trigger. They must find out exactly what sets off their symptoms and try to avoid it. If you can't get away from your trigger, you may have to use a corticosteroid inhaler to ease symptoms. Pescatore also likes vitamin A, which has been shown to help get rid of the mucus in the respiratory tract, which can be an irritant

History of Asthma:

The earliest recorded reference to respiratory distress – a disorder characterized by “noisy breathing” (wheezing?) is found in China in 2600 BC.

The Babylonian “Code of Hammurabi” recorded symptoms of breathlessness: “If a man's lungs pant with his work.” (1792-1750 BC).

Hippocrates (~400 BC) was the first to use the term “Asthma” (Greek for “wind” or “to blow”) for panting and respiratory distress. He is considered to be the physician who identified the relationship between the environment and respiratory disease correlating climate and location with illness. Some suggest he was the first allergist.

When Alexander the Great invaded India, smoking the herb stramonium (an anticholinergic agent related to ipratropium and tiotropium currently used in inhalers) was used to relax the lungs.

Roman doctors described asthma as gasping and the inability to breathe without making noise. They noted “if from running or any other work, the breath becomes difficult, it is called asthma.” Pliny the elder (~ 50 AD) observed that pollen was a source of respiratory difficulty and recommended the use of “ephedra” (forerunner of ephedrine) in red wine as an asthma remedy. Unfortunately, he also suggested that drinking the blood of wild horses and eating 21 millipedes soaked in honey could help.

Signs and Symptoms:

Asthma is characterized recurrent episodes of wheezing, shortness of breath, chest tightness, and coughing. Sputum may be produced from the lung by coughing but is often hard to bring up. During recovery from an attack, it may appear pus-like due to high levels of white blood cells called eosinophils. Symptoms are usually worse at night and in the early morning or in response to exercise or cold air. Some people with asthma rarely experience symptoms, usually in response to triggers, whereas others may have marked and persistent symptoms.

1. Associated conditions:

A number of other health conditions occur more frequently in those with asthma, including gastro-esophageal reflux disease (GERD), rhinosinusitis, and obstructive sleep apnea. Psychological disorders are also more common, with anxiety disorders occurring in between 16–52% and mood disorders in 14–41%. However, it is not known if asthma causes psychological problems or if psychological problems lead to asthma. Those with asthma, especially if it is poorly controlled, are at high risk for radiocontrast reactions.

Causes:

Asthma is caused by a combination of complex and incompletely understood environmental and genetic interactions. These factors influence both its severity and its responsiveness to treatment. It is believed that the recent increased rates of asthma are due to changing epigenetics (heritable factors other than those related to the DNA sequence) and a changing living environment. Onset before age 12 is more likely due to genetic influence, while onset after 12 is more likely due to environmental influence.

1. Environmental:-

Many environmental factors have been associated with asthma's development and exacerbation including allergens, air pollution, and other environmental chemicals. Smoking during pregnancy and after delivery is associated with a greater risk of asthma-like symptoms. Low air quality from factors such as traffic pollution or high ozone levels has been associated with both asthma development and increased asthma severity. Over half of cases in children in the United States occur in areas with air quality below EPA standards. Low air quality is more common in low-income and minority communities.

Exposure to indoor volatile organic compounds may be a trigger for asthma; formaldehyde exposure, for example, has a positive association. Also, phthalates in certain types of PVC are associated with asthma in children and adults.

There is an association between acetaminophen (paracetamol) use and asthma. The majority of the evidence does not, however, support a causal role. A 2014 review found that the association disappeared when respiratory infections were taken into account. Use by a mother during pregnancy is also associated with an increased risk as is psychological stress during pregnancy.

Asthma is associated with exposure to indoor allergens. Common indoor allergens include dust mites, cockroaches, animal dander (fragments of fur or feathers), and mold. Efforts to decrease dust mites have been found to be ineffective on symptoms in sensitized subjects. Certain viral respiratory infections, such as respiratory syncytial virus and rhinovirus, may increase the risk of developing asthma when acquired as young children. Certain other infections, however, may decrease the risk.

2. Medical conditions:

A triad of atopic eczema, allergic rhinitis and asthma is called atopy. The strongest risk factor for developing asthma is a history of atopic disease; with asthma occurring at a much greater rate in those who have either eczema or hay fever. Asthma has been associated.

with eosinophilic granulomatosis with polyangiitis (formerly known as Churg–Strauss syndrome), an autoimmune disease and vasculitis.

There is a correlation between obesity and the risk of asthma with both having increased in recent years. Several factors may be at play including decreased respiratory function due to a buildup of fat and the fact that adipose tissue leads to a pro-inflammatory state.

Beta blocker medications such as propranolol can trigger asthma in those who are susceptible. Cardioselective beta-blockers, however, appear safe in those with mild or moderate disease. Other medications that can cause problems in asthmatics are angiotensin-converting enzyme inhibitors, aspirin, and NSAIDs.



Diagram of asthma

Diagnosis:

While asthma is a well-recognized condition, there is not one universal agreed upon definition. It is defined by the Global Initiative for Asthma as "a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role. The chronic inflammation is associated with airway hyper-responsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness and coughing particularly at night or in the early morning. These episodes are usually associated with widespread but variable airflow obstruction within the lung that is often reversible either spontaneously or with treatment".

There is currently no precise test for the diagnosis, which is typically based on the pattern of symptoms and response to therapy over time. A diagnosis of asthma should be suspected if there is a history of recurrent wheezing, coughing or difficulty breathing and these symptoms occur or worsen due to exercise, viral infections, allergens or air pollution. Spirometry is then used to confirm the diagnosis. In children under the age of six the diagnosis is more difficult as they are too young for spirometry.

1. Spirometry:

Spirometry is recommended to aid in diagnosis and management. It is the single best test for asthma. If the FEV1 measured by this technique improves more than 12% and increases by at least 200 milliliters following administration of a bronchodilator such as salbutamol, this is supportive of the diagnosis. It however may be normal in those with a history of mild asthma, not currently acting up. As caffeine is a bronchodilator in people with asthma, the use of caffeine before a lung function test may interfere with the results. Single-breath diffusing capacity can help differentiate asthma from COPD. It is reasonable to perform spirometry every one or two years to follow how well a person's asthma is controlled.

Classification:

Clinical classification (≥ 12 years old)					
Severity	Symptom	Nighttime	%FEV1 of	FEV1 Variability	SABA use
Intermittent	≤2/week	≤2/month	≥80%	<20%	≤2 days/week
Mild persistent	>2/week	3–4/month	≥80%	20–30%	>2
Moderate	Daily	>1/week	60–80%	>30%	Daily
Severe persistent	Continuously	Frequent	<60%	>30%	≥twice/day

Asthma is clinically classified according to the frequency of symptoms, forced expiratory volume in one second (FEV1), and peak expiratory flow rate. Asthma may also be classified as atopic (extrinsic) or non-atopic (intrinsic), based on whether symptoms are precipitated by allergens (atopic) or not (non-atopic). While asthma is classified based on severity, at the moment there is no clear method for classifying different subgroups of asthma beyond this system.

Although asthma is a chronic obstructive condition, it is not considered as a part.

of chronic obstructive pulmonary disease as this term refers specifically to combinations of disease that are irreversible such as bronchiectasis, chronic bronchitis, and emphysema. Unlike these diseases, the airway obstruction in asthma is usually reversible; however, if left untreated, the chronic inflammation from asthma can lead the lungs to become irreversibly obstructed due to airway remodeling. In contrast to emphysema, asthma affects the bronchi, not the alveoli.

2. Exercise-induced:

Exercise can trigger bronchoconstriction both in people with or without asthma. It occurs in most people with asthma and up to 20% of people without asthma. Exercise-induced bronchoconstriction is common in professional athletes. The highest rates are among cyclists (up to 45%), swimmers, and cross-country skiers. While it may occur with any weather conditions it is more common when it is dry and cold. Inhaled beta2-agonists do not appear to improve athletic performance among those without asthma however oral doses may improve endurance and strength.

3. Aspirin-induced asthma:

Aspirin-exacerbated respiratory disease, also known as aspirin-induced asthma, affects up to 9% of asthmatics. Reactions may also occur to other NSAIDs. People affected often also have trouble with nasal polyps. In people who are affected low doses paracetamol or COX-2 inhibitors are generally safe.

4. Alcohol-induced asthma:

Alcohol may worsen asthmatic symptoms in up to a third of people. This may be even more common in some ethnic groups such as the Japanese and those with aspirin-induced asthma. Other studies have found improvement in asthmatic symptoms from alcohol.

5. Non allergic asthma:

Nonallergic asthma, also known as intrinsic or nonatopic asthma makes up between 10 and 33% of cases. There is negative skin test to common inhalant allergens and normal serum concentrations of IgE. Often it starts later in life and women are more commonly affected than men. Usual treatments may not work as well.

6. Differential diagnosis:

Many other conditions can cause symptoms similar to those of asthma. In children, other upper airway diseases such as allergic rhinitis and sinusitis should be considered as well as other causes of airway obstruction including: foreign body aspiration, tracheal stenosis or laryngotracheomalacia, vascular rings, enlarged lymph nodes or neck masses. Bronchiolitis and other viral infections may also produce wheezing. In

adults, COPD, congestive heart failure, airway masses, as well as drug-induced coughing due to ACE inhibitors should be considered. In both populations vocal cord dysfunction may present similarly.

Chronic obstructive pulmonary disease can coexist with asthma and can occur as a complication of chronic asthma. After the age of 65, most people with obstructive airway disease will have asthma and COPD. In this setting, COPD can be differentiated by increased airway neutrophils, abnormally increased wall thickness, and increased smooth muscle in the bronchi.

However, this level of investigation is not performed due to COPD and asthma sharing similar principles of management: corticosteroids, long-acting beta-agonists, and smoking cessation. It closely resembles asthma in symptoms, is correlated with more exposure to cigarette smoke, an older age, less symptom reversibility after bronchodilator administration, and decreased likelihood of family history of atopy.

Prevention:

The evidence for the effectiveness of measures to prevent the development of asthma is weak. Some show promise including: limiting smoke exposure both in utero and after

delivery, breastfeeding, and increased exposure to daycare or large families but none are well supported enough to be recommended for this indication. Early pet exposure may be useful. Results from exposure to pets at other times are inconclusive and it is only recommended that pets be removed from the home if a person has allergic symptoms to said pet.] Dietary restrictions during pregnancy or when breast feeding have not been found to be effective and thus are not recommended. Reducing or eliminating compounds known to sensitive people from the workplace may be effective. It is not clear if annual influenza vaccinations affect the risk of exacerbations. Immunization; however, is recommended by the World Health Organization. Smoking bans are effective in decreasing exacerbations of asthma.

Pathophysiology:**1. Host Factors**

Asthma is a complex compilation of signs and symptoms that are patient specific. The general etiologic factors that predispose a person to asthma are atopy and exposure to environmental triggers. Compared with developing nations, the incidence and prevalence of asthma are much higher in Western countries because of changes in lifestyles that include extremely clean household environments and fewer circulating infectious diseases. This so-called hygiene hypothesis is based on scientific observation that because of lack of exposure to infectious organisms, the immune system is no longer challenged adequately in children born in industrialized nations (Schroder 2008). In this model, the developing immune system shifts the balance between what would normally be equal parts of T-helper (Th) cells type 1 and type 2

(Okada 2010). The lack of exposure to bacteria shifts the immune system toward a Th2 cell-mediated immunity (Figure 1-1). This shift favors the development of allergic disorders, including asthma, because Th2 cells produce interleukins (i.e., IL-4, IL-5, IL-6, and IL-13) that contribute to atopy through immunoglobulin E production.

Management:

While there is no cure for asthma, symptoms can typically be improved. A specific, customized plan for proactively monitoring and managing symptoms should be created. This plan should include the reduction of exposure to allergens, testing to assess the severity of symptoms, and the usage of medications. The treatment plan should be written down and advise adjustments to treatment according to changes in symptoms.

The most effective treatment for asthma is identifying triggers, such as cigarette smoke, pets, or aspirin, and eliminating exposure to them. If trigger avoidance is insufficient, the use of medication is recommended. Pharmaceutical drugs are selected based on, among other things, the severity of illness and the frequency of symptoms. Specific medications for asthma are broadly classified into fast-acting and long-acting categories.

Bronchodilators are recommended for short-term relief of symptoms. In those with occasional attacks, no other medication is

needed. If mild persistent disease is present (more than two attacks a week), low-dose inhaled corticosteroids or alternatively, an oral leukotriene antagonist or a mast cell stabilizer is recommended. For those who have daily attacks, a higher dose of inhaled corticosteroids is used. In a moderate or severe exacerbation, oral corticosteroids are added to these treatments.

Epidemiology:

It is estimated that in the United States, 18.7 million adults (8.2%) and 7 million children (9.4%) have asthma, and that 29.1 million adults (12.7%) and 10.1 million children (13.6%) will receive a diagnosis of asthma during their lifetimes. The prevalence of asthma has risen by 14.8% in less than 10 years (2001 to 2010) (Asthma Impact on the Nation 2011).

Medications:

Medications used to treat asthma are divided into two general classes: quick-relief medications used to treat acute symptoms; and long-term control medications used to prevent further exacerbation. Antibiotics are generally not needed for sudden worsening of symptoms.

1. Fast-acting:



Salbutamol metered dose inhaler commonly used to treat asthma attacks.

- Short-acting beta2-adrenoceptor agonists (SABA), such as salbutamol (albuterol USAN) are the first line treatment for asthma symptoms. They are recommended before exercise in those with exercise induced symptoms.
- Anticholinergic medications, such as ipratropium bromide, provide additional benefit when used in combination with SABA in those with moderate or severe.
- symptoms. Anticholinergic bronchodilators can also be used if a person cannot tolerate a
- SABA. If a child requires admission to hospital additional ipratropium does not appear to help over a SABA.
- Older, less selective adrenergic agonists, such as inhaled epinephrine, have similar efficacy to SABAs.] They are however not recommended due to concerns regarding excessive cardiac stimulation.



2. Long-term control

Fluticasone propionate metered dose inhaler commonly used for long-term control.

- Corticosteroids are generally considered the most effective treatment available for long-term control. Inhaled forms such as beclomethasone are usually used except in the case of severe persistent disease, in which oral corticosteroids may be needed. It is usually recommended that inhaled formulations be used once or twice daily, depending on the severity of symptoms.
- Long-acting beta-adrenoceptor agonists (LABA) such as salmeterol and formoterol can improve asthma control, at least in adults,

when given in combination with inhaled corticosteroids. In children this benefit is uncertain. When used without steroids they increase the risk of severe side-effects and even with corticosteroids they may slightly increase the risk.

- Leukotriene receptor antagonists (such as montelukast and zafirlukast) may be used in addition to inhaled corticosteroids, typically also in conjunction with a LABA. Evidence is insufficient to support use in acute exacerbations. In children they appear to be of little benefit when added to inhaled steroids, and the same applies in adolescents and adults. They are useful by themselves. In those under five years of age, they were.

Anti-asthmatic drugs & New Treatment:

Bronchodilators:

(Quick relief medications) treat acute episodic attack of asthma

Short acting β_2 -agonists

Antimuscarinic

Xanthine preparations

Sympathomimetic

Mechanism of Action

β - Adrenoceptor agonists

direct β_2 stimulation stimulate adenylyl Cyclase Increase camp Bronchodilation

Inhibit mediators release from mast cells. Increase mucus clearance .

Classification of agonists

Non selective β_2 agonists:

epinephrine - isoprenaline Selective β_2 – agonists (Preferable). Salbutamol (albuterol)

Terbutaline Salmeterol Formeterol

Non selective β -agonists.

Epinephrine

Potent bronchodilator

rapid action (maximum effect within 15 min).

S.C. or by inhalation (aerosol or nebulizer).

Has short duration of action (60-90 min)

Drug of choice for acute anaphylaxis

Nebulizer Inhaler:



Disadvantages:

Not effective orally. Hyperglycemia CVS side effects:

tachycardia, arrhythmia, hypertension

Skeletal muscle tremor

Not suitable for asthmatic patients with hypertension or heart failure.

Contraindication:

CVS patients, diabetic patients

Selective β_2 –agonists

drugs of choice for acute attack of asthma Are mainly given by inhalation (metered dose inhaler or nebulizer).

Can be given orally, parenterally.

Short acting β_2 agonists

e.g. salbutamol, terbutaline Long acting β_2 agonists

e.g. salmeterol, formeterol

Short acting β_2 agonists

Salbutamol, inhalation, orally, i.v. Terbutaline, inhalation, orally, s.c. Have rapid onset of action (15-30 min). short duration of action (4-6 hr) used for symptomatic treatment of acute episodic attack of asthma.

Long acting selective β_2 agonists

Salmeterol & formeterol:

Long-acting bronchodilators (12 hours)

have high lipid solubility (creates depot effect) are given by inhalation.

are not used to relieve acute episodes of asthma used for nocturnal asthma (long-acting relievers).

combined with inhaled corticosteroids to control asthma (decreases the number and severity of asthma attacks).

Anti-inflammatory Agents:

(Control medications or prophylactic therapy) reduce the frequency of attacks.

- Corticosteroids
- Mast cell stabilizers
- Leukotrienes antagonists
- Anti-IgE monoclonal antibody
- Long acting β 2-agonists

Adverse effects:

Long-term use of inhaled corticosteroids at conventional doses carries a minor risk of adverse effects. Risks include the development of cataracts and a mild regression in stature.

Some are new treatments as below:

For people living with asthma or allergies, life can sometimes be difficult. Especially during the high allergy seasons. Many people struggle to function in their daily lives and have to avoid going outside or exercising. For these people medical breakthroughs in asthma and allergies are of high importance so here are a few of the recent developments in asthma and allergies.

One of the most recent developments, as early as March 2017, is that scientists have found a protein, HMGB1, that is related to asthma and is not triggered by allergens. The study showed that people who have moderate to severe asthma experience inflammation from the overproduction of mucus from this protein. The HMGB1 protein is released in the lung passages, and the bronchioles constrict making it difficult to breathe. Now that researchers have finally found this protein and how it functions within the respiratory system, pharmaceutical companies can work with scientists on developing new prescriptions for people who suffer from asthma.

There are also new developments for people who suffer from exercise-induced asthma. Studies suggest that if you suffer from this kind of asthma, you should use a “short-acting” or “fast-acting” inhaler, such as albuterol (Proventil) at least 20 minutes before exercising. If you have daily asthma symptoms, you should use a maintenance medicine, such as an inhaled corticosteroid (Symbicort or Pulmicort) to keep your asthma under control. You may also want to talk to your doctor about using a daily leukotriene receptor drug, such as Singular as a daily maintenance medicine. Both factors, taking your daily medicine, in addition to your “fast-acting” inhaler, will help you have a better and more effective workout.

There has also come to light a new study that reveals that the root cause of asthma is environmental triggers, like allergens, cigarette smoke, or certain perfumes. This has already been under suspicion for many years, however, has not been proven until a couple of years ago. In this study, researchers found that the calcium-sensing receptor (CaSR) causes allergy induced asthma triggering airway inflammation, twitching in the breathing passages, as well as causing them to become narrow making it harder for you to breathe. Scientists are still researching different medications to help with this reaction in the lungs but think that drugs known as calcilytics can help reverse this reaction in the respiratory system. This would help millions of asthmatics live more comfortable lives.

Others:

When asthma is unresponsive to usual medications, other options are available for both emergency management and prevention of flareups. For emergency management other options include:

- Oxygen is used to alleviate hypoxia if saturations fall below 92%.
- Corticosteroid by mouth are recommended with five days of prednisone being the same 2 days of dexamethasone.
- Magnesium sulfate intravenous treatment increases bronchodilation when used in addition to other treatment in moderate severe acute asthma attacks. In adults it results in a reduction of hospital admissions.
- Heliox, a mixture of helium and oxygen, may also be considered in severe unresponsive cases.
- Intravenous salbutamol is not supported by available evidence and is thus used only in extreme cases.
- Methylxanthines (such as theophylline) were once widely used, but do not add significantly to the effects of inhaled beta-agonists. Their use in acute exacerbations is controversial.

For those with severe persistent asthma not controlled by inhaled corticosteroids and LABAs, bronchial thermoplasty may be an option. It involves the delivery of controlled thermal energy to the airway wall during a series of bronchoscopies unknown. Evidence suggests that sublingual immunotherapy in those with both allergic rhinitis and asthma improve outcomes.

Alternative medicine:

Many people with asthma, like those with other chronic disorders, use alternative treatments; surveys show that roughly 50% use some form of unconventional therapy. There is little data to support the effectiveness of most of these therapies. Evidence is insufficient to support the usage of Vitamin C. There is tentative support for its use in exercise induced bronchospasm. In people with mild to moderate asthma, treatment with vitamin

D supplementation is likely to reduce the risk of asthma exacerbation.

Acupuncture is not recommended for treatment as there is insufficient evidence to support its use. Air ionizers show no evidence that they improve asthma symptoms or benefit lung function; this applied equally to positive and negative ion generators.

Manual therapies, including osteopathic, chiropractic, physiotherapeutic and respiratory therapeutic maneuvers, have insufficient evidence to support their use in treating

asthma. The Buteyko breathing technique for controlling hyperventilation may result in a

reduction in medication use; however, the technique does not have any effect on lung function. Thus, an expert panel felt that evidence was insufficient to support its use.

Conclusion:

Asthma is a chronic inflammatory disorder of the airway. The features of asthma have complication for the diagnosis, management, potential and prevention of the asthma disease.

The implementation of precision medicine in the management and treatment of asthma. A variety of biomarkers have been used clinically to predict the response to steroids therapy and in the clinical trials setting to identify the patients.

References:

1. GINA 2011, p. 18
2. "Asthma Fact sheet N°307". WHO. November 2013. Archived from the original on June 29, 2011. Retrieved 3 March 2016.
3. NHLBI Guideline 2007, pp. 11–12
4. British Guideline 2009, p. 4
5. Martinez FD (2007). "Genes, environments, development and asthma: a reappraisal". *European Respiratory Journal*. 29 (1): 179–84. doi:10.1183/09031936.00087906. PMID 17197483.
6. Lemanske, R.F.; Busse, W.W. (February 2010). "Asthma: clinical expression and molecular mechanisms". *J. Allergy Clin. Immunol.* 125 (2 Suppl 2): S95–102. doi:10.1016/j.jaci.2009.10.047. PMC 2853245 . PMID 20176271. b c Yawn BP (September 2008). "Factors accounting for asthma variability: achieving 7 optimal symptom control for individual patients" (PDF). *Primary Care Respiratory Journal*. 17 (3): 138– doi:10.3132/pcrj.2008.00004. PMID 18264646. Archived (PDF) from the original on 2010-03-04.
7. B Kumar, Vinay; Abbas, Abul K; Fausto, Nelson; Aster, Jon, eds. (2010). *Robbins and Cotran pathologic basis of disease* (8th ed.). Saunders. p. 688. ISBN 978-1-4160-3121-5. OCLC 643462931.
8. *Stedman's Medical Dictionary* (28 ed.). Lippincott Williams and Wilkins. 2005. ISBN 0-7817-3390-1.
9. NHLBI Guideline 2007, pp. 169–172 10. GINA 2011, p. 71
10. GINA 2011, p. 33
11. ^{b c d} Scott JP, Peters-Golden M (September 2013). "Antileukotriene agents for the treatment of lung disease". *Am. J. Respir. Crit. Care Med.* 188 (5): 538–544. doi:10.1164/rccm.201301-0023PP. PMID 23822826.
12. ^{b c d} NHLBI Guideline 2007, p. 214
13. ^{b c} NHLBI Guideline 2007, pp.373–375

